

Figure S1

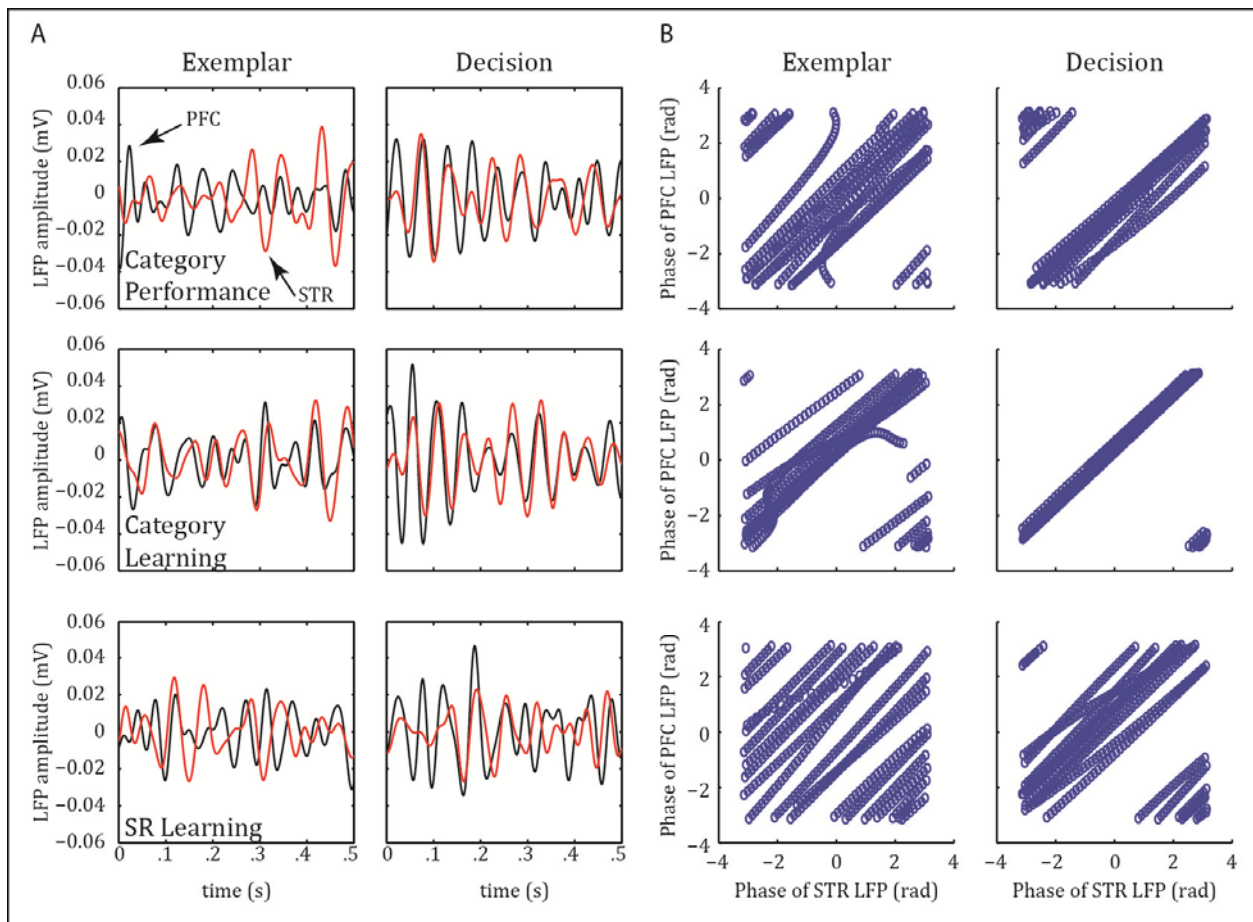


Figure S1 – Single-trial examples of synchrony: **A.** Single-trial simultaneous LFP recordings from a PFC electrode (black line) and a STR electrode (red line), as a function of time (x axis), trial epoch (left column: exemplar, right column: decision), and experimental stage (bottom row: SR Learning, middle row: Category Learning, top row: Category Performance). The LFP signals have been passband-filtered to illustrate the beta frequency band (12-30 Hz). Synchronization of the 2 LFP signals increases during the decision epoch of the Category Learning and Category Performance stages compared to the SR Learning stage. **B.** Scatterplots of instantaneous 20-Hz phase of the same LFP signals as in A. The appearance of continuous oblique lines is generated by virtue of the LFP's autoregressive nature, whereby all phases from -3.14 to +3.14 radians are consecutively recorded. Increased synchrony in the decision epoch of the Category Learning and Category Performance stages is obvious as a decrease in the spread of the PFC and STR phases, compared to the other epochs and learning stages.

Figure S2

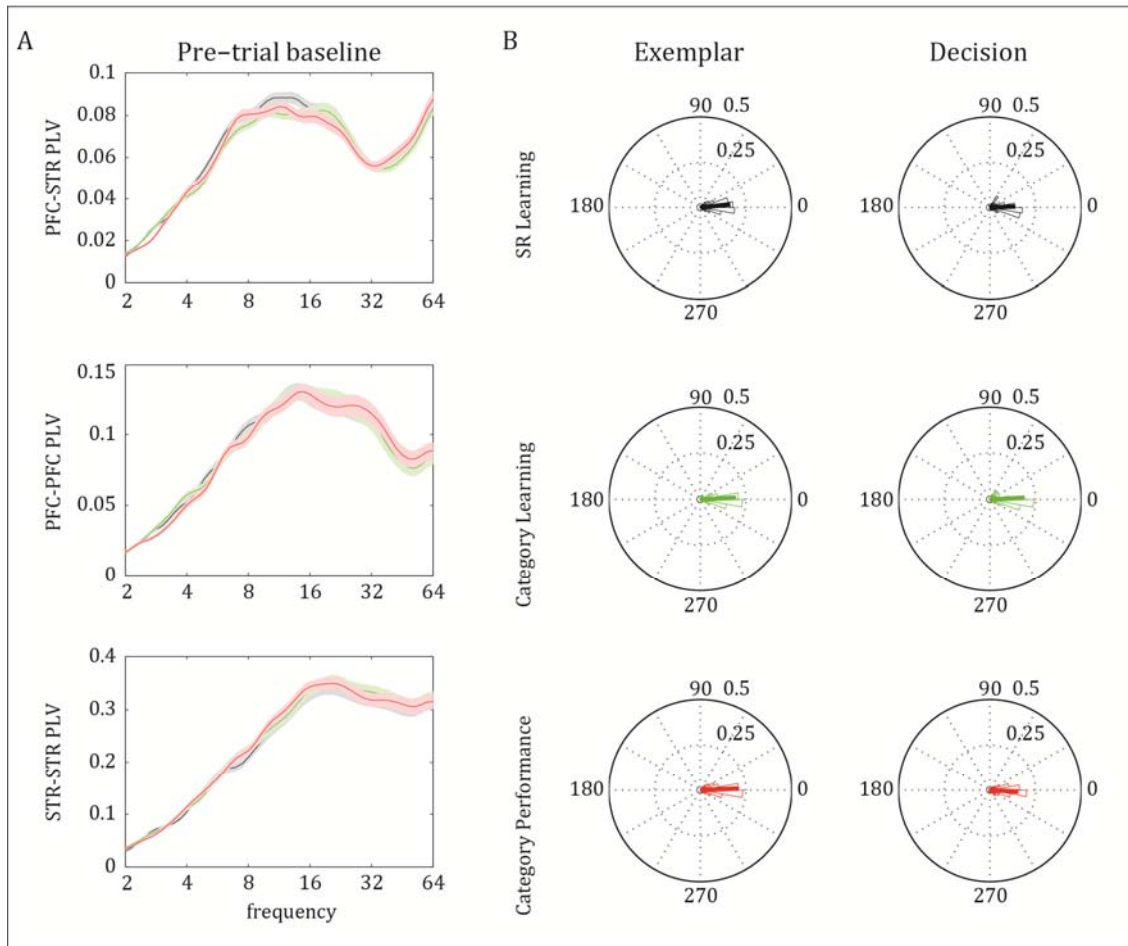


Figure S2 - Synchrony between prefrontal cortex and striatum: A. Average PLV (\pm SEM) across all electrode pairs between prefrontal cortex (PFC) and striatum (STR; top), within PFC (middle), and within STR (bottom) across the 3 stages of learning (same color coding as in Figs 2 and 3) during the pre-trial baseline (500 ms at the middle of the 3-s ITI). No changes in synchrony are observed, contrary to the PFC-STR synchrony of the decision epoch (Fig. 2), which increased significantly from SR Learning to Category Learning. **B.** Circular probability distribution of phase-lags (in degrees) between the PFC and STR LFPs during the exemplar and decision epochs of the 3 learning stages. Thick lines indicate average phase-lag.

Figure S3

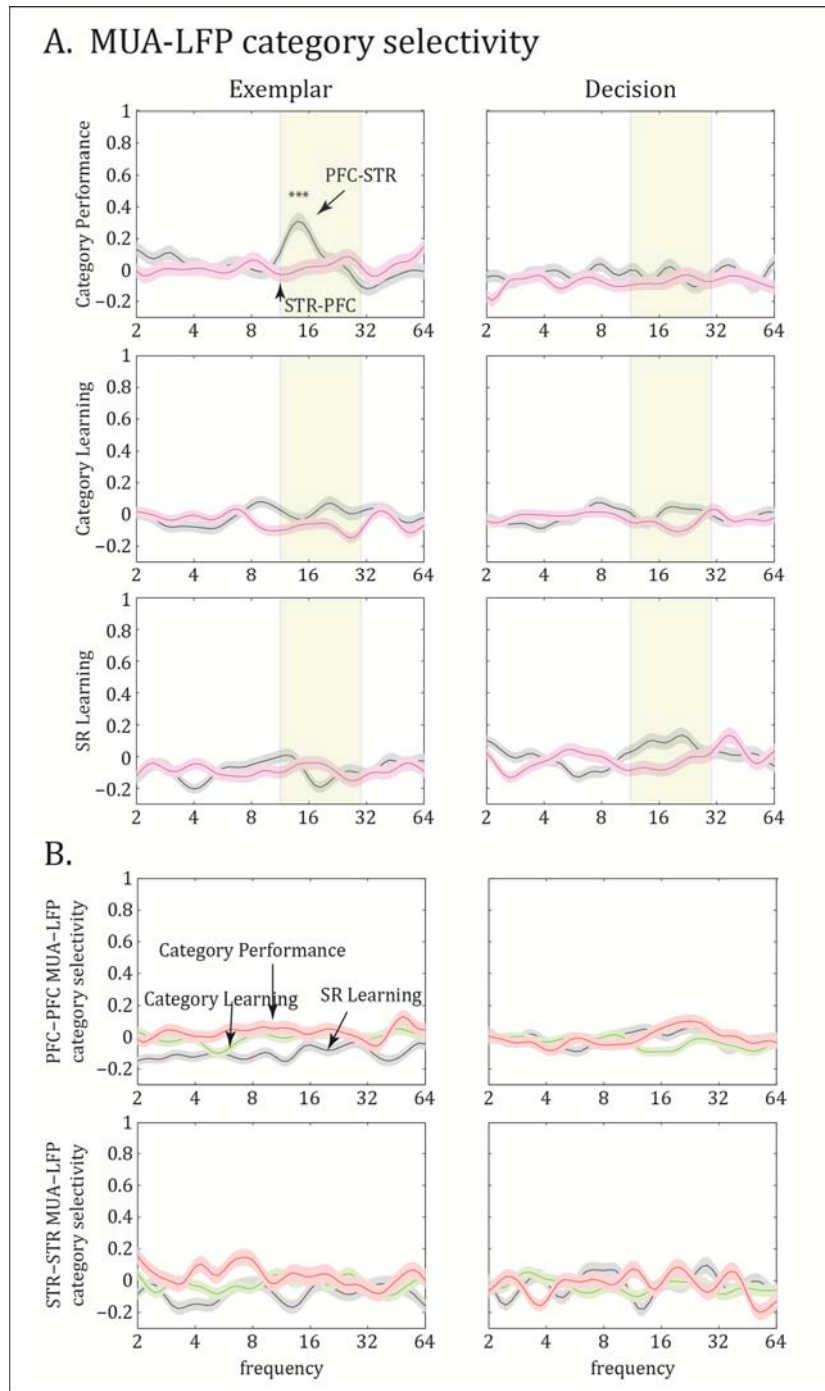


Figure S3 - Category-selective spike-LFP synchrony: A. Comparison between the 2 directions of spike-LFP synchrony: spikes in PFC and LFP in STR (PFC-STR) vs. spikes in STR and LFP in PFC (STR-PFC). Average (\pm SEM) category-selective synchrony (z-transformed d'), during the exemplar and decision epochs of the 3 learning stages. **B.** Average (\pm SEM) category-selective spike-LFP synchrony (z-transformed d') within PFC (top) and within STR (bottom), across the 3 learning stages during the exemplar and decision epochs.